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AMSAT NEWS SERVICE
ANS-330

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The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, the Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor [at] amsat.org

You can sign up for free e-mail delivery of the AMSAT News Service Bulletins via the ANS List; to join this list see: https://mailman.amsat.org/postorius/lists/ans.amsat.org/

ANS-330 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2023 Nov 26

Happy 10th Birthday FUNcube-1 (AO-73)

November 21, 2023, marks the tenth birthday of our very first CubeSat mission, FUNcube-1 (AO-73).

A very short time after the launch from Yasny in Russia and within a few minutes from deployment, the very first frame of data from the low power transmitter on board, was detected and decoded by ZS1LS in South Africa. He was able to relay the data over the internet from his Dashboard to the Data Warehouse and the numbers, appeared, as if by magic, at the launch party being held at the RSGB National Radio Centre at Bletchley Park.

After a very brief check out, the FUNcube team were able to switch the transmitter to full power, again at the very first attempt, and were quite amazed at the strength of the signal from the 300mW transmitter on 145.935

MHz. The transponder was then switched on and successfully tested, the first contact was between G6LVB and M5AKA who were both operating from the Bletchley Park car park.

The team finished the day with a request to AMSAT-NA for an Oscar number and were delighted to receive the AO73 Oscar 73 designation!

Since then, FUNcube-1, with a launch mass of less than 1kg, has operated continuously with only a very few interruptions. In excess of 53,500 orbits, 1.3 billion miles travelled, 61 million telemetry data packets transmitted, and with more than 10.9 million unique data packets downloaded and stored in the Data Warehouse.

The FUNcube team still receive many requests for Fitter message uploads for school events…please contact us by email to operations(a)funcube.org.uk giving us at least two weeks notice.

The FUNcube team continue to be very grateful to all the many stations around the world that continue to upload the telemetry that they receive to our Data Warehouse. They really need this data to provide a continuous resource for educational outreach.

FUNcube Data Warehouse and the Dashboard software
https://funcube.org.uk/working-documents/funcube-telemetry-dashboard/

FUNcube email group https://groups.io/g/FUNcube

FUNcube Website http://www.funcube.org.uk/

[ANS thanks AMSAT-UK for the above information]

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establish the first communications via the ground station. Afterward, HERON Mk. II will begin a year of regular operations during which the team will regularly monitor the satellite's health.

The lessons learned from mission operations and monitoring the satellite's health will inform the development of future satellite missions undertaken by UTAT Space Systems.

With the launch of HERON Mk. II, UTAT Space Systems has lowered the barrier to entry for space programs even further by becoming the first organization in Canada to receive the entirety of its satellite development funding from a student levy. This marks yet another paradigm shift in the industry, demonstrating that students are capable of sourcing their own space mission funding, rather than solely relying on government grants or commercial sponsorships.

>From an educational perspective, the HERON Mk. II mission will enable team members to learn more about satellite operations and amateur radio and to gain knowledge that will carry forward to UTAT Space Systems' future missions.

[ANS thanks The Varsity, student newspaper of the University of Toronto, for the above information]

Starship Flies Higher

Seven long months after Starship's first integrated flight test in April, Ship 25 launched atop Booster 9 on a second test flight, again targeting a ballistic trajectory with a planned splashdown north of Hawai'i.

This time, all 33 Raptor 2 engines on Booster 9 completed a full first-stage burn, producing a 300-meter-long exhaust plume and roughly twice the thrust of any other object flown by humanity.

The 121-meter monster rocket also completed what appeared to be a successful hot stage separation, with B9 shutting down all but three of its Raptors (which were throttled to 50%) followed by S25's six engines starting up to push the ship away from the booster.

Hot staging reduces gravity losses and keeps the upper stage continuously under thrust for fuel settling.

After stage separation, B9 completed a somewhat vigorous flip and, perhaps due to propellant slosh or damage, had trouble relighting its Raptor engines. (Engines that ingest tank pressurization gas instead of propellant generally end up functioning quite destructively.)

After several "high energy" events at the aft end of Booster 9, an explosion originating from its common bulkhead rapidly disassembled the booster.

After separation, Starship's upper stage burned until seconds before entering its planned coast phase—climbing to an altitude of 148 km and over 6.7 km/s, reaching space and very nearly hitting orbital velocity.

However, S25 appeared to trigger its automated flight termination system during terminal guidance, possibly due to a leak in its oxygen tank—debris from the explosion were caught on NOAA radar extending past Puerto Rico.

The thermal protection system (TPS) made up of 18,000 tiles, appeared to lose a significant number of tiles during the launch, especially ones that were glued on near weld points, making the ship unlikely to have survived

reentry even if the flight had made it that far.

S28's TPS tiles are said to have an improved adhesion process that has been tested with a suction cup plus force meter to verify attachment. One additional clear success was the performance of SpaceX's much improved "stage zero"—the water deluge system appeared undamaged and very little other damage and debris have been spotted by ever-vigilant tank watchers.

Due to a complete loss of both stages, the FAA will conduct another mishap investigation, although many hope it will be significantly more streamlined due to the improved FTS functionality and better performance of the launch system—in particular, the Fish and Wildlife Service may not be involved this time.

The always-optimistic Musk suggests a next test flight for Starship in 3-4 weeks, and with plenty of hardware waiting in the wings (S28 and B10 are likely up next), the timeline will probably be determined yet again by the mishap investigation and mitigation process. NASA seems keen to get on with it though as the agency believes its lunar lander mission may take up to 20 Starship launches

[ANS thanks The Orbital Index for the above information]

ITU RA-23 Adopts Resolution for Space Spectrum

The ITU Radiocommunication Assembly 2023 (RA-23), a precursor to the World Radiocommunication Conference, WRC-23, wrapped up on November 17 with a lot of new resolutions covering 6G standards, sustainable usage of space spectrum and gender equality.

RA-23, which was held last week in Dubai, adopted the new Recommendation ITU-R M. 2160 on the "IMT-2030 Framework," which sets the basis for development of 6G, a.k.a. IMT-2030. The next phase will be the definition of relevant requirements and evaluation criteria for potential radio interface technologies.

The assembly also adopted a a new resolution on space sustainability to facilitate the long-term sustainable use of radio spectrum and associated satellite orbit resources used by space services, in in accordance with Resolution 219 (Bucharest, 2022). The ITU says this resolution will benefit the satellite sector and support further cooperation with other United Nations organizations.

RA-23 also finished a new ITU-R Recommendation on the protection of the radio navigation-satellite service and amateur satellite services, and adopted a a new resolution on the use of IMT technologies for fixed wireless broadband.

The assembly also agreed to revise ITU-R Resolution 65 to facilitate studies looking at the compatibility of current regulations with potential 6G IMT radio interface technologies for 2030 and beyond.

Resolution ITU-R 8-3 was also revised to promote the participation of engineers and scientists from developing countries in radiowave propagation campaigns in tropical and subtropical regions with limited data monitoring.

The RA-23 resolutions arrive just ahead of WRC-23, which commenced November 20 in Dubai and will run until 15 December 2023. Hot items on the agenda include the ongoing battle between the satellite and mobile sectors for 5G spectrum, especially as non-terrestrial networks become part of 3GPP's 5G standards, the development of direct-to-device satellite services, and revisiting rules about satellite power limits for LEO satellites, to name a

few.

To learn more about the WRC-23, visit
https://www.itu.int/wrc-23/about/about-wrcs/.

[ANS thanks DevelopingTelecoms.com for the above information]

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Note, all times are approximate. It is recommended that you do your own orbital prediction or start listening about 10 minutes before the listed time.

The latest information on the operation mode can be found at https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors for the above information]

Upcoming Satellite Operations

None scheduled at this time.

A growing number of satellite rovers are currently engaged in sharing their grid square activations on https://hams.at. By visiting the website, you gain easy access to comprehensive information about the operators responsible for activating specific grid squares. Additionally, you have the ability to assess the match score between yourself and a particular rover for a given pass, while also being able to identify the upcoming satellite passes that are accessible from your location.

[ANS thanks Ian Parsons, K5ZM, AMSAT rover page manager, for the above information]

Hamfests, Conventions, Maker Faires, and Other Events

AMSAT Ambassadors provide presentations, demonstrate communicating through amateur satellites, and host information tables at club meetings, hamfests, conventions, maker faires, and other events.

None scheduled at this time.

[ANS thanks the AMSAT Events page for the above information]

Satellite Shorts From All Over

+ EIRSAT-1 is expected to launch on a Space X Falcon 9 rocket from the Vandenberg Air Force Base in California, USA, on November 29, 2023. It will have a downlink on the IARU coordinated frequency of 437.100 MHz, see https://iaru.amsat-uk.org/finished_detail.php?serialnum=639. Information on the beacon can be found at https://github.com/ucd-eirsat-1/beacon. EIRSAT-1 was built by students from University College Dublin under the framework of ESA Academy’s Fly Your Satellite! programme (FYS). (ANS thanks AMSAT-UK for the above information)

+ The European Space Agency conducted a long-duration firing of an Ariane 6 prototype Nov. 23, one of the final tests before the agency is ready to set a date for the rocket’s inaugural launch. ESA said Ariane 6 “passed” the test in a statement shortly afterwards, describing it as a “seven-minute full firing” of the engine, rather than the nearly eight minutes advertised beforehand. (ANS thanks SpaceNews.com for the above information)

+ The tool bag recently lost by NASA astronauts during a spacewalk is now orbiting Earth and is surprisingly visible to stargazers. The object can

appear as bright as a 6th-magnitude star. The tool bag changes slightly in brightness, suggesting the object is tumbling as it orbits our planet. Although the tool bag was ahead of the International Space Station (ISS) by about a minute or two shortly after the incident, it is gradually appearing farther ahead of the ISS as it loses altitude. By mid-November, the tool bag should be ahead by about ten minutes. (ANS thanks EarthSky.org for the above information)

+ With the Sun in the way of our messages, Curiosity and Perseverance, along with Ingenuity, MRO, Odyssey, and MAVEN, are hunkered down during the Mars solar conjunction communication blackout. Curiosity has now spent 4,000 sols exploring the red planet and has driven 32 km. (ANS thanks The Orbital Index for the above information)

Join AMSAT today at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
* Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Mark Johns, KØJM
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